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Effects of pressure on spin fluctuations and the exchange interaction in La_2CuO_4 as determined by two-magnon Raman scattering (abstract)

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We have measured the two-magnon Raman scattering spectrum of magnetic La_2CuO_4 at pressures of up to 100 kbar. Analysis of the moments of the two-magnon line shape indicates that the renormalization parameters resulting from spin fluctuations are essentially pressure independent in this pressure range. Our results provide the first direct determination of the pressure dependence of the in-plane exchange coupling constant J. The pressure dependence of J is compared with that of the Néel temperature and discussed in the context of recent theories for quasi-two-dimensional magnetic systems.

Work performed while S. B. Dierker was a Member of Technical Staff at A.T.&T. Bell Laboratories and M. C. Aronson a Postdoctoral Research Assistant at Los Alamos National Laboratory.

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